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Date: 3/23/2004 3:30 PM
Subject: IPP Uprate Study Proposal
Attachments: IPP Generator Study Proposal Final 2-3-2004.doc; Engineering Study Terms and Conditions.doc

Ralph,

Here is the most recent Uprate Study Proposal and Terms.

<<IPP Generator Study Proposal Final 2-3-2004.doc>> <<Engineering Study Terms and Conditions.doc>>
Thank You,

Matt
g GE Energy
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From: <cecil.james@ps.ge.com>
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Date: 7/6/2004 11:11 AM
Subject: Generator Uprate - Key Bid Specification Requirements
Attachments: IPP Generator Uprate Spec - Wordperfect.doc; IPP Generator Uprate Spec.pdf

Jon, Phong:

Here is Kirk's summary of the key elements of a generator uprate and rewind specification:

<<IPP Generator Uprate Spec - Wordperfect.doc>> <<IPP Generator Uprate Spec.pdf>>

This generic specification covers the rewind and the key points for an uprate evaluation/proposal.

Parts of section 2.0 would facilitate purchasing bars as an separate contract.

Take a look at section 9.0 and let me know if you have any questions. The list of components is non-inclusive but has a caveat that vendors submit an analysis and design summary of all systems impacted by their uprate proposal. Kirk itemized the principal systems that are impacted by an uprate and believes this will get you a suitable threshold analysis if all vendors address each of them. Keeping this section short would minimize confusion and at the same time establish the scope of the analysis you want as part of the vendor's bid.

Call me if you have any questions and or need anything else.

Cecil

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**DRAFT
SPECIFICATION COVER SHEET**

SPECIFICATION

FOR

TURBINE GENERATOR STATOR REWIND

Specification No. _____ Rev. _

Specification Title: **TURBINE GENERATOR STATOR REWIND**

1.0 SCOPE - Contractor shall provide all materials, engineering, qualified personnel, and required equipment to perform the main turbine generator water cooled stator winding replacement. The work shall be coordinated between the Contractor and the Purchaser's designated representative for technical administration. The design is to be in accordance with all latest standard including ANSI and IEEE.

1.1 EXISTING GENERATOR INFORMATION

The existing nameplate for the generator is:

1.2 NEW GENERATOR REQUIREMENTS AND REWIND SCOPE

1.2.1 DESIGN

The rewound generator shall have the following characteristics and ratings:

1.2.2 DOCUMENTATION

Three (3) months prior to the rewind outage, the Contractor will provide updated operating parameters including:

- 1.2.2.1 Review current stator cooling operating parameters and provide recommendations for new operating parameters as required to facilitate operation of the new stator winding.
- 1.2.2.2 High bulk water outlet alarm temp (old)_____, (new)_____
- 1.2.2.3 High stator bar outlet water temp alarm (old)_____, (new)_____
- 1.2.2.4 High temperature between stator bar alarm (old)_____, (new)_____
- 1.2.2.5 Stator Water Coolers: Station cooling water flow through coolers: _____ gpm @ 95 F, _____ - FT loss. Heat rejection to coolers: ____KW
- 1.2.2.6 Hydrogen Cooler Design operating pressure XX psig. Station cooling water flow through coolers: _____ gpm @ 95 F, _____ - FT loss. Heat rejection to coolers: ____KW
- 1.2.2.7 Rated output with one H2 cooler out of service: (old)_____, (new)_____
- 1.2.2.8 Rated output with two H2 coolers out of service: (old)_____, (new)_____
- 1.2.2.9 Verification of fill-in data
- 1.2.2.10 Contractor shall provide a winding diagram for the new winding as well as all generator capability curves, V-curves, etc. that are changed as a result of the Rewind.

- 1.2.2.11 Contractor to provide description of tests performed on reused materials such as connection rings and bushings. Contractor is to demonstrate that a contingency plan exists if this equipment fails to meet test criteria.
- 1.3 PROPOSAL INFORMATION AND FILL-IN DATA
- 1.3.1 The Contractor shall provide an experience list of other water-cooled generator stator rewinds.
- 1.3.2 Discuss maximum insulation stress in volts per mil and the Contractors experience at that level.
- 1.3.3 Provide description of tests to be performed on equipment to be reused like connection rings and bushings with acceptance criteria.
- 1.3.4 Provide a discussion of high potential test of completed rewind with specific recommendations for test method and test voltage.
- 1.3.5 Identify any deviations from this specification. During the work, the Contractor is to notify the Purchaser of any deviation from the specification that develops.
- 2.0 GENERATOR STATOR REWIND SCOPE OF SUPPLY - Contractor shall provide or perform the following:
- 2.1 Contractor shall provide all materials, engineering, qualified personnel, and required equipment to perform the main turbine-generator water-cooled stator winding replacement. The work shall be coordinated between Contractor and Purchaser's designated representative for technical administration.
- 2.2 Contractor shall provide a detailed technical description of the new stator bar design in the proposal.
- 2.3 Contractor shall clean, inspect and test the stator core prior to and after installing the new stator winding. Testing shall be performed by EL-CID test prior to removal of wedges, after removal of wedges and after completion of rewind
- 2.4 All stator winding components and connections shall be insulated to the full phase-to-phase voltage rating of the machine.
- 2.5 Each stator bar shall be insulated to Class "F" thermal standards (155° C hotspot). Contractor to describe in detail the insulation system used.
- 2.6 The ground wall insulation may be applied as a continuous tape automatically machine wound (preferred) over the entire length of the straight bar to achieve constant pressure pull with consistent overlap. Regardless of method used Contractor shall ensure compact insulation with minimum void development.
- 2.7 The stator slot section shall be corona shielded by the application of a conductive paint or armor tape to suppress slot discharges under high voltage conditions. A corona suppression gradient shall also be applied to the stator bar end arms and connection rings.

- The type of corona suppression system (paints or tapes) that will be employed in the slot portion of the bars and on the end arm of the bars specifying length of suppression on end arms and length of overlap with slot suppression will be identified.
- 2.8 The winding shall be designed so that the coils are adequately supported and braced to minimize radial and lateral movement in the slots and to withstand all forces developed under electrical fault conditions, with minimal damage.
 - 2.9 Semi-conductive side filler shall be used to provide positive pressure on the stator bars necessary to prevent vibration sparking and slot discharges.
 - 2.10 Contractor's typical cross section drawing of a slot shall show a top and bottom bar and all springs, filler material and wedges.
 - 2.11 All bars and connections in the end winding shall be fully insulated.
 - 2.12 The stator end winding support system shall be of a proven design that allows movement in the axial direction but provides constraining support in the radial and lateral directions. Identification of components that will be re-used on the existing end winding support system and which ones will be replaced as well as what new components will be incorporated will be identified.
 - 2.13 Insulation system shall be resistant to oil and water.
 - 2.14 The following will be incorporated: (i) The method of insulating series connections as well as method of making electrical connections on series and phase joints will be described. (ii) If the connection rings are to be re-used, describe any inspection and repair procedures to be utilized, (iii) If connection rings are to be replaced, a description of the new components and their difference from old and associated advantages. Such new components shall be provided by Contractor as part of this scope of supply.
 - 2.15 There shall be no bare or exposed copper on the completed winding.
 - 2.16 One- (1) discharge water thermocouple (Type X) per stator slot shall be provided by and installed by Contractor as part of this scope of supply. Sufficient new thermocouple cable routed from each slot discharge thermocouple to the penetration in the stator frame. In addition, new stator frame penetration sealing glands for the thermocouple cable shall be provided by and installed.
 - 2.17 One dual element slot RTD (XXX ohm) in each stator slot shall be provided by and installed by Contractor as part of this scope of supply. Sufficient new cable routed from each slot RTD to the penetration in the stator frame. In addition, new stator frame penetration sealing glands for the RTD cable shall be provided by and installed.
 - 2.18 The winding and stator core shall be painted with "tagging" compounds in accordance with the original specification for identification of hot spots in conjunction with the use of a core or condition monitor and the chemical identification of those tags will be made available for future detection.
 - 2.19 All shipping containers shall be clearly marked to identify contents with a packing slip

included inside each box and a copy on the outside in a sealed plastic envelope securely attached. The list shall be in sufficient detail to enable identification of contents without opening.

- 2.20 The method to be used to encapsulate the end windings after the rewind to retard movement or insulation damage will be described and incorporated.
- 2.21 Determine the compatibility of spare stator bars currently in the Purchaser's stock system.
- 2.22 The new stator winding shall be leak tight after assembly. Contractor to describe method of testing and acceptance criteria.
- 2.23 The new stator winding wedges are to be assembled tight. Contractor to describe the stator wedging system, method of testing tightness and acceptance criteria.
- 2.24 The new stator winding shall not have detrimental mechanical resonance. Contractor to describe test method and acceptance criteria.
- 2.25 Stator wedge materials shall not be of a material known to abrade the stator core iron.
- 2.26 A post-outage final report (hard copy and electronic) is required within sixty- (60) days after the completion of the work scope defined herein. Contractor shall include the following as a minimum:
 - 2.26.1 Detailed descriptions of all work performed under this Contract.
 - 2.26.2 A record of all final measurements and test results taken on individual components.
 - 2.26.3 NDE records of all components examined.
 - 2.26.4 All Contractor recommendations for improvements.
 - 2.26.5 A complete list of materials used including replacement parts.
 - 2.26.6 A complete list of recommended spare parts for future outages.
 - 2.26.7 A start-up report, if start-up performed by Contractor, in both hard copy and suitable electronic version.
 - 2.26.8 All Technical Information Letter (TIL) activities performed or recommended to be performed in the future.
 - 2.26.9 Recommendations and intervals for future inspections and maintenance of the rewound stator and the existing field.
- 2.27 Hard copies of updated manuals or manual inserts are also to be provided. Manuals or inserts are to reflect all changes, including amended operation guidelines of all generator subsystems, resulting from the generator stator rewind and include a complete list of spare materials for the main generator.
- 2.28 The Contractor shall furnish all parts, materials and labor required to install a permanently

mounted field flux probe including, but not limited to, the flux probe, mounting hardware, wiring, terminal box, etc. The flux probe shall be installed such that it is pre-connected and the data junction box is accessible on the outside of the generator. Contractor to provide post installation data collection and analysis.

- 2.29 The Contractor shall provide all parts, materials and labor required to install permanent partial discharge analysis (PDA) couplers including, but not limited to, the couplers, mounting hardware, wiring, etc. This shall include complete installation including high frequency CTs at each bus coupler capacitor and installing all the wiring to the Contractor mounted terminal box. Contractor to provide post installation PDA data collection and analysis.

3.0 OUTAGE SCHEDULE REQUIREMENTS

3.1 Schedule

- 3.1.1 Contractor to provide rewind Schedule prior to the outage and update it daily during the outage.

- 3.2 Work Planning Details are to be defined as part of the pre-outage planning between the Contractor and the Purchaser.

3.3 Project Preparation Activities Work Schedule

- 3.3.1 Material Delivery

- 3.3.2 Equipment Delivery

- 3.3.3 Overhead Crane Estimated Schedule

- 3.3.4 Laydown Area Plan

- 3.3.4.1 Contractor to provide a minimum area required for lay down space.

- 3.3.5 Contingency Planning

4.0 CONTRACTOR'S GENERAL RESPONSIBILITIES

- 4.1 Qualified Personnel Contractor shall be responsible for providing technically qualified and competent personnel to perform the engineering, design, analysis, calculations, stator rewind, and other tasks associated with this workscope. Winder technicians shall be skilled in rewinding of large generators and shall provide resumes or documented skill register qualification sheets indicating level of proficiency.

- 4.2 Replacement Winding – Included in Contractor's scope of supply are the stator bars, winding supplies, plumbing connections, RTD's and wiring, epoxies, resins, and all short and long term shelf life materials required to rewind the Purchaser's generator stator. Contractor shall supply detailed list of materials supplied.

- 4.3 Safety Manual - All work shall be performed in accordance with Purchaser's Safety Manual. Hard-hats, safety-toed shoes, and safety glasses shall be worn, as required in designated

industrial areas. Contractor shall obtain a copy of the latest revision of Purchaser's Safety Manual and be familiar with its contents.

(NOTE: Contractor's personnel arriving on-site should come prepared with the necessary safety equipment as referenced in this paragraph.)

- 4.4 Housekeeping – Contractor shall maintain good housekeeping practices in the work area.
- 4.5 Computers and Office Equipment. - Contractor shall provide all necessary computers and office equipment required for their own use in execution of the work.
- 4.6 Administrative Work - Contractor shall provide administrative services necessary to summarize work performed.
- 4.7 Chemical Control – The Contractor shall place all empty or partially used chemicals in a receptacle provided by the Purchaser. Use of chemicals and hazardous materials shall be kept to a minimum. Contractor shall provide chemical storage locker for chemicals used during the rewind. Contractor is responsible for notifying the Purchaser's technical representative to obtain direction for the proper disposal of all chemicals and expended containers. The Contractor shall supply Material Safety Data Sheets (MSDS) for material used at the request of the Purchaser.
- 4.8 Temporary Lighting - Contractor will supply all temporary lighting fixtures necessary to perform the work scope.
- 4.9 Quality Control Manual – Contractor to provide uncontrolled copy of Quality Control Manual that will be used for the on-site portion of the work.
- 4.1 Asbestos Confinement and Abatement – Contractor shall be responsible for identifying all items associated with the scope that contain asbestos. Contractor shall identify all items associated with the Rewind that contain asbestos. Contractor shall wrap in plastic all asbestos containing materials and place in purchaser's designated area or receptacle. The Contractor will clearly identify the scope of work pertaining to asbestos abatement that is included as part of the Contractor's offering. The Contractor shall place all removed stator bars and winding materials into a receptacle supplied by the Purchaser. The Purchaser shall dispose of these materials.
- 4.2 Asbestos Air Monitoring – Contractor shall perform initial air monitoring using a licensed and approved contractor for asbestos.
- 4.3 Asbestos Worker Training/Certification – Contractor's asbestos program to be subject to Purchaser's review. Contractor shall ensure that their employees and subcontractor's employees meet OSHA asbestos worker training and/or certification / licensing requirements.
- 4.4 Respirator Qualification - All contractor personnel performing activities where the use of respiratory protection devices are required must be qualified to wear such protection devices in accordance with OSHA.
- 4.5 Electrical Requirements – For all turbine deck activities, contractor shall identify all

temporary power needs and provide a temporary generator in accordance with Purchaser's pre-outage schedule and milestones, and shall initiate the necessary support work orders to have the temporary power installed. Contractor shall also prepare and provide a laydown map of the Turbine Operating Floor consisting of tool, temporary power stations, and equipment amperage and voltage requirements.

- 4.6 Tools and Equipment - The Contractor will provide equipment and tools to perform the rewind that minimize the impact on the Purchaser's resources and facilities.
- 5.0 PURCHASER'S RESPONSIBILITIES - Purchaser shall be responsible for the following:
 - 5.1 Chemical Disposal – Provide receptacles for disposal of all chemicals used.
 - 5.2 Asbestos Abatement – Provide for asbestos abatement to include scheduling and coordinating all abatement activities associated with the Rewind. This includes all EPA, State and Local licensing, permitting and supervisory requirements.
 - 5.3 Telephone, Computer, & Office Space - Provide three (3) telephone extensions and office space for Contractor's exclusive use in close proximity to the work area.
 - 5.4 Restroom - Maintain restroom facilities in close proximity to the work area.
 - 5.5 Break Facilities - Provide lunch break facilities for the craft personnel in close proximity to the work area.
 - 5.6 I&C and Electrician Support - Provide Instrument Technicians and Electricians as necessary to remove, store, and reinstall the supervisory instrumentation, shaft grounding devices, motor disconnects, thermocouples, etc.
 - 5.7 Special Tools, Spare Parts/Consumables, Coatings - Unless otherwise specifically identified herein, provide standard and special Turbine/Generator tools supplied with the unit including castle wrenches, rotor stand, power rollers, slings, special rigging, coupling bolt tools, spare parts, protective coatings, and consumable materials as required.
 - 5.8 Electric Power - Provide temporary electric power, as necessary, for Contractor's work activities.
 - 5.9 Scaffolding and Heavy Cribbing - Provide all scaffolding and heavy cribbing.
 - 5.10 Service Air and Water - Provide service air and water requirements, as necessary.
 - 5.11 Waste Disposal - Disposal of waste materials, including oily wastes collected properly and parceled by Contractor, in accordance with Purchaser's procedures.
 - 5.12 Component Laydown Plan - Develop a component laydown plan with the Contractor.
- 6.0 STATOR BAR QUALITY ASSURANCE REQUIREMENTS- Contractor shall perform the following as part of the stator manufacturing process:
 - 6.1 Contractor shall assure that appropriate witness points are included in manufacturing schedule and advise of same by making available a schedule agreeable to Purchaser.

- 6.2 Describe the method for shipping stator bars and insuring protection against damage.
- 6.3 Each stator bar shall be given a final AC high voltage endurance test at 3E (three times rated voltage) for one minute.
- 6.4 Each bar shall be strand-to-strand tested at minimum of 50AC RMS before water boxes are attached.
- 6.5 Each bar shall be pressure tested at a minimum of 100 psi and show no leakage over a one-hour period.
- 6.6 Each bar shall be vacuum tested.
- 6.7 Each bar shall be subjected to a final flow test using dry nitrogen or equivalent.
- 6.8 Results of each of the above tests are to be documented for each stator bar and provided to the Purchasers designated technical representative for review following bar manufacture.
- 7.0 REWIND TESTING - Contractor shall perform the following tests during and upon completion of the stator rewind
- 7.1 EL-CID testing for condition of stator core iron shall be performed prior to the rewind, after removal of the stator wedges and done again after final assembly.
- 7.2 Pressure Decay Test:
 - 7.2.1 Final pressure decay shall be less than 1 cu ft/day.
- 7.3 Vacuum Decay Test:
 - 7.3.1 Final vacuum decay shall be less than 3 cu ft/day.
- 7.4 Baseline Stator Bar Capacitance Mapping
- 7.5 Perform the following tests as directed by Purchaser's technical representative, before, during and after stator repair activities, to determine the condition of the stator windings:
 - 7.5.1 Winding insulation resistance tests.
 - 7.5.2 Dielectric absorption tests.
 - 7.5.3 Direct current leakage tests.
 - 7.5.4 AC high potential test at 2E+1 kV, or the equivalent DC voltage level to be performed following completion of the rewind.
- 7.6 Perform and document 500V DC insulation resistance test of all core and slot RTD's and individual RTD element resistance checks corrected for temperature.
- 7.7 Read and document values of all the stator winding RTDs the local junction boxes and correlate all RTDs to specific bar locations.

- 7.8 Read and document values of all stator cooling hose TC's from the local junction boxes and correlate all TCs to specific bars.
- 7.9 Perform and document 500V megger of generator C/E bearing ring, H₂ seal, oil deflector, and lift pump connection insulation resistance prior to and following generator rewind.
- 7.10 Perform and document an AC Hi-Pot test of each phase (with other phases grounded) following completion of all rewind work.
- 7.11 Perform a mechanical resonance test.
- 7.12 Perform a suitable flow test to insure absence of obstructions and full flow capability. Describe the type of test
- 7.13 Perform a shall leak test the water supply header assembly
- 7.14 Perform a tightness test of the new stator wedge assembly.

8.0 OPTIONS

8.1 GENERATOR GAS MONITORING SYSTEM

Contractor shall provide option pricing to provide all parts, materials and labor required to upgrade the existing Generator Core Monitor to a Generator Gas Monitoring System similar to the General Electric GGMS including, but not limited to, the processor, piping, electronics, engineering, etc.

8.2 GENERATOR STATOR LEAK MONITORING SYSTEM

Contractor shall provide option pricing to provide all parts, materials and labor required to install a Generator Stator Leak Monitoring System including, but not limited to, the processor, piping, electronics, engineering, etc. Details of the proposed Stator Leak Monitoring System shall be incorporated herein.

9.0 GENERATOR UPRATE EVALUATION AND QUOTATION

9.1 GENERATOR UPRATE REQUIREMENTS

The Contractor shall provide an assessment of the generator to accommodate an uprate to:

1056 MVA, 0.9 power factor.

The evaluation will identify components requiring modification or replacement to support the uprate. A quotation will be provided for the necessary Parts and Services.

9.2 EQUIPMENT TO BE EVALUATED

The below equipment and systems will be included in the uprate evaluation:

- 9.2.1 Stator core
- 9.2.2 Stator core end
- 9.2.3 Armature winding
- 9.2.4 Rotor and Field Winding and associated components
- 9.2.5 Rotor Mechanical Capability
- 9.2.6 Main generator hydrogen coolers
- 9.2.7 High Voltage Bushings
- 9.2.8 Stator Water Cooling System
- 9.2.9 Hydrogen Control System
- 9.2.10 Collector Rings
- 9.2.11 Brush Rigging Assembly
- 9.2.12 Excitation System

The Contractor will address any other equipment impacted by the uprate. Unless specifically stated otherwise, the Purchaser will evaluate the iso-phase bus and neutral enclosure.

2.1

(Signature)

(Date)

**DRAFT
SPECIFICATION COVER SHEET**

SPECIFICATION

FOR

TURBINE GENERATOR STATOR REWIND

Specification No. ____Rev.

Specification Title: **TURBINE GENERATOR STATOR REWIND**

- 1.0 SCOPE - Contractor shall provide all materials, engineering, qualified personnel, and required equipment to perform the main turbine generator water cooled stator winding replacement. The work shall be coordinated between the Contractor and the Purchaser's designated representative for technical administration. The design is to be in accordance with all latest standard including ANSI and IEEE.

1.1 EXISTING GENERATOR INFORMATION

The existing nameplate for the generator is:

1.2 NEW GENERATOR REQUIREMENTS AND REWIND SCOPE

1.2.1 DESIGN

The rewound generator shall have the following characteristics and ratings:

1.2.2 DOCUMENTATION

Three (3) months prior to the rewind outage, the Contractor will provide updated operating parameters including:

1.2.2.1 Review current stator cooling operating parameters and provide recommendations for new operating parameters as required to facilitate operation of the new stator winding.

1.2.2.2 High bulk water outlet alarm temp (old)_____,
(new)_____

1.2.2.3 High stator bar outlet water temp alarm (old)_____,
(new)_____

1.2.2.4 High temperature between stator bar alarm (old)_____,
(new)_____

1.2.2.5 Stator Water Coolers: Station cooling water flow through coolers:
_____ gpm @ 95 F, _____ - FT loss. Heat
rejection to coolers: _____KW

1.2.2.6 Hydrogen Cooler Design operating pressure XX psig. Station
cooling water flow through coolers: _____ gpm @ 95 F,
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1.2.2.7 Rated output with one H2 cooler out of service: (old)_____,
(new)_____

1.2.2.8 Rated output with two H2 coolers out of service:
(old)_____, (new)_____

1.2.2.9 Verification of fill-in data

1.2.2.10 Contractor shall provide a winding diagram for the new winding as well as all generator capability curves, V-curves, etc. that are changed as a result of the Rewind.

1.2.2.11 Contractor to provide description of tests performed on reused materials such as connection rings and bushings. Contractor is to demonstrate that a contingency plan exists if this equipment fails to meet test criteria.

1.3 PROPOSAL INFORMATION AND FILL-IN DATA

1.3.1 The Contractor shall provide an experience list of other water-cooled generator stator rewinds.

1.3.2 Discuss maximum insulation stress in volts per mil and the Contractors experience at that level.

1.3.3 Provide description of tests to be performed on equipment to be reused like connection rings and bushings with acceptance criteria.

1.3.4 Provide a discussion of high potential test of completed rewind with specific recommendations for test method and test voltage.

1.3.5 Identify any deviations from this specification. During the work, the Contractor is to notify the Purchaser of any deviation from the specification that develops.

2.0 GENERATOR STATOR REWIND SCOPE OF SUPPLY - Contractor shall provide or perform the following:

2.1 Contractor shall provide all materials, engineering, qualified personnel, and required equipment to perform the main turbine-generator water-cooled stator winding replacement. The work shall be coordinated between Contractor and Purchaser's designated representative for technical administration.

2.2 Contractor shall provide a detailed technical description of the new stator bar design in the proposal.

2.3 Contractor shall clean, inspect and test the stator core prior to and after installing the new stator winding. Testing shall be performed by EL-CID test prior to removal of wedges, after removal of wedges and after completion of rewind

2.4 All stator winding components and connections shall be insulated to the full phase-to-phase voltage rating of the machine.

2.5 Each stator bar shall be insulated to Class "F" thermal standards (155° C hotspot). Contractor to describe in detail the insulation system used.

2.6 The ground wall insulation may be applied as a continuous tape automatically machine wound (preferred) over the entire length of the straight bar to achieve constant pressure pull with consistent overlap. Regardless of method used Contractor shall ensure compact insulation with minimum void development.

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conjunction with the use of a core or condition monitor and the chemical identification of those tags will be made available for future detection.

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 - 2.26.8 All Technical Information Letter (TIL) activities performed or recommended to be performed in the future.
 - 2.26.9 Recommendations and intervals for future inspections and maintenance of the rewound stator and the existing field.

- 2.27 Hard copies of updated manuals or manual inserts are also to be provided. Manuals or inserts are to reflect all changes, including amended operation guidelines of all generator subsystems, resulting from the generator stator rewind and include a complete list of spare materials for the main generator.
- 2.28 The Contractor shall furnish all parts, materials and labor required to install a permanently mounted field flux probe including, but not limited to, the flux probe, mounting hardware, wiring, terminal box, etc. The flux probe shall be installed such that it is pre-connected and the data junction box is accessible on the outside of the generator. Contractor to provide post installation data collection and analysis.
- 2.29 The Contractor shall provide all parts, materials and labor required to install permanent partial discharge analysis (PDA) couplers including, but not limited to, the couplers, mounting hardware, wiring, etc. This shall include complete installation including high frequency CTs at each bus coupler capacitor and installing all the wiring to the Contractor mounted terminal box. Contractor to provide post installation PDA data collection and analysis.

3.0 OUTAGE SCHEDULE REQUIREMENTS

3.1 Schedule

- 3.1.1 Contractor to provide rewind Schedule prior to the outage and update it daily during the outage.

3.2 Work Planning Details are to be defined as part of the pre-outage planning between the Contractor and the Purchaser.

3.3 Project Preparation Activities Work Schedule

3.3.1 Material Delivery

3.3.2 Equipment Delivery

3.3.3 Overhead Crane Estimated Schedule

3.3.4 Laydown Area Plan

- 3.3.4.1 Contractor to provide a minimum area required for lay down space.

3.3.5 Contingency Planning

4.0 CONTRACTOR'S GENERAL RESPONSIBILITIES

- 4.1 Qualified Personnel Contractor shall be responsible for providing technically qualified and competent personnel to perform the engineering, design, analysis, calculations, stator rewind, and other tasks associated with this workscope. Winder technicians shall be skilled in rewinding of large generators and shall provide resumes or documented skill register qualification sheets indicating level of proficiency.

- 4.2 Replacement Winding – Included in Contractor's scope of supply are the stator bars, winding supplies, plumbing connections, RTD's and wiring, epoxies, resins, and all short and long term shelf life materials required to rewind the Purchaser's generator stator. Contractor shall supply detailed list of materials supplied.
- 4.3 Safety Manual - All work shall be performed in accordance with Purchaser's Safety Manual. Hard-hats, safety-toed shoes, and safety glasses shall be worn, as required in designated industrial areas. Contractor shall obtain a copy of the latest revision of Purchaser's Safety Manual and be familiar with its contents.
- (NOTE: Contractor's personnel arriving on-site should come prepared with the necessary safety equipment as referenced in this paragraph.)
- 4.4 Housekeeping – Contractor shall maintain good housekeeping practices in the work area.
- 4.5 Computers and Office Equipment. – Contractor shall provide all necessary computers and office equipment required for their own use in execution of the work.
- 4.6 Administrative Work - Contractor shall provide administrative services necessary to summarize work performed.
- 4.7 Chemical Control – The Contractor shall place all empty or partially used chemicals in a receptacle provided by the Purchaser. Use of chemicals and hazardous materials shall be kept to a minimum. Contractor shall provide chemical storage locker for chemicals used during the rewind. Contractor is responsible for notifying the Purchaser's technical representative to obtain direction for the proper disposal of all chemicals and expended containers. The Contractor shall supply Material Safety Data Sheets (MSDS) for material used at the request of the Purchaser.
- 4.8 Temporary Lighting - Contractor will supply all temporary lighting fixtures necessary to perform the work scope.
- 4.9 Quality Control Manual – Contractor to provide uncontrolled copy of Quality Control Manual that will be used for the on-site portion of the work.
- 4.1 Asbestos Confinement and Abatement – Contractor shall be responsible for identifying all items associated with the scope that contain asbestos. Contractor shall identify all items associated with the Rewind that contain asbestos. Contractor shall wrap in plastic all asbestos containing materials and place in purchaser's designated area or receptacle. The Contractor will clearly identify the scope of work pertaining to asbestos abatement that is included as part of the Contractor's offering. The Contractor shall place all removed stator bars and winding materials into a receptacle supplied by the Purchaser. The Purchaser shall dispose of these materials.
- 4.2 Asbestos Air Monitoring – Contractor shall perform initial air monitoring using a licensed and approved contractor for asbestos.

- 4.3 Asbestos Worker Training/Certification – Contractor’s asbestos program to be subject to Purchaser’s review. Contractor shall ensure that their employees and subcontractor’s employees meet OSHA asbestos worker training and/or certification / licensing requirements.
- 4.4 Respirator Qualification - All contractor personnel performing activities where the use of respiratory protection devices are required must be qualified to wear such protection devices in accordance with OSHA.
- 4.5 Electrical Requirements – For all turbine deck activities, contractor shall identify all temporary power needs and provide a temporary generator in accordance with Purchaser’s pre-outage schedule and milestones, and shall initiate the necessary support work orders to have the temporary power installed. Contractor shall also prepare and provide a laydown map of the Turbine Operating Floor consisting of tool, temporary power stations, and equipment amperage and voltage requirements.
- 4.6 Tools and Equipment - The Contractor will provide equipment and tools to perform the rewind that minimize the impact on the Purchaser’s resources and facilities.
- 5.0 PURCHASER’S RESPONSIBILITIES - Purchaser shall be responsible for the following:
 - 5.1 Chemical Disposal – Provide receptacles for disposal of all chemicals used.
 - 5.2 Asbestos Abatement – Provide for asbestos abatement to include scheduling and coordinating all abatement activities associated with the Rewind. This includes all EPA, State and Local licensing, permitting and supervisory requirements.
 - 5.3 Telephone, Computer, & Office Space - Provide three (3) telephone extensions and office space for Contractor’s exclusive use in close proximity to the work area.
 - 5.4 Restroom - Maintain restroom facilities in close proximity to the work area.
 - 5.5 Break Facilities - Provide lunch break facilities for the craft personnel in close proximity to the work area.
 - 5.6 I&C and Electrician Support - Provide Instrument Technicians and Electricians as necessary to remove, store, and reinstall the supervisory instrumentation, shaft grounding devices, motor disconnects, thermocouples, etc.
 - 5.7 Special Tools, Spare Parts/Consumables, Coatings - Unless otherwise specifically identified herein, provide standard and special Turbine/Generator tools supplied with the unit including castle wrenches, rotor stand, power rollers, slings, special rigging, coupling bolt tools, spare parts, protective coatings, and consumable materials as required.
 - 5.8 Electric Power - Provide temporary electric power, as necessary, for Contractor’s work activities.

- 5.9 Scaffolding and Heavy Cribbing - Provide all scaffolding and heavy cribbing.
- 5.10 Service Air and Water - Provide service air and water requirements, as necessary.
- 5.11 Waste Disposal - Disposal of waste materials, including oily wastes collected properly and parceled by Contractor, in accordance with Purchaser's procedures.
- 5.12 Component Laydown Plan - Develop a component laydown plan with the Contractor.
- 6.0 STATOR BAR QUALITY ASSURANCE REQUIREMENTS- Contractor shall perform the following as part of the stator manufacturing process:
 - 6.1 Contractor shall assure that appropriate witness points are included in manufacturing schedule and advise of same by making available a schedule agreeable to Purchaser.
 - 6.2 Describe the method for shipping stator bars and insuring protection against damage.
 - 6.3 Each stator bar shall be given a final AC high voltage endurance test at 3E (three times rated voltage) for one minute.
 - 6.4 Each bar shall be strand-to-strand tested at minimum of 50AC RMS before water boxes are attached.
 - 6.5 Each bar shall be pressure tested at a minimum of 100 psi and show no leakage over a one-hour period.
 - 6.6 Each bar shall be vacuum tested.
 - 6.7 Each bar shall be subjected to a final flow test using dry nitrogen or equivalent.
 - 6.8 Results of each of the above tests are to be documented for each stator bar and provided to the Purchasers designated technical representative for review following bar manufacture.
- 7.0 REWIND TESTING - Contractor shall perform the following tests during and upon completion of the stator rewind
 - 7.1 EL-CID testing for condition of stator core iron shall be performed prior to the rewind, after removal of the stator wedges and done again after final assembly.
 - 7.2 Pressure Decay Test:
 - 7.2.1 Final pressure decay shall be less than 1 cu ft/day.
 - 7.3 Vacuum Decay Test:
 - 7.3.1 Final vacuum decay shall be less than 3 cu ft/day.
 - 7.4 Baseline Stator Bar Capacitance Mapping

- 7.5 Perform the following tests as directed by Purchaser's technical representative, before, during and after stator repair activities, to determine the condition of the stator windings:
 - 7.5.1 Winding insulation resistance tests.
 - 7.5.2 Dielectric absorption tests.
 - 7.5.3 Direct current leakage tests.
 - 7.5.4 AC high potential test at 2E+1 kV, or the equivalent DC voltage level to be performed following completion of the rewind.
- 7.6 Perform and document 500V DC insulation resistance test of all core and slot RTD's and individual RTD element resistance checks corrected for temperature.
- 7.7 Read and document values of all the stator winding RTDs the local junction boxes and correlate all RTDs to specific bar locations.
- 7.8 Read and document values of all stator cooling hose TC's from the local junction boxes and correlate all TCs to specific bars.
- 7.9 Perform and document 500V megger of generator C/E bearing ring, H₂ seal, oil deflector, and lift pump connection insulation resistance prior to and following generator rewind.
- 7.10 Perform and document an AC Hi-Pot test of each phase (with other phases grounded) following completion of all rewind work.
- 7.11 Perform a mechanical resonance test.
- 7.12 Perform a suitable flow test to insure absence of obstructions and full flow capability. Describe the type of test
- 7.13 Perform a shall leak test the water supply header assembly
- 7.14 Perform a tightness test of the new stator wedge assembly.

8.0 OPTIONS

8.1 GENERATOR GAS MONITORING SYSTEM

Contractor shall provide option pricing to provide all parts, materials and labor required to upgrade the existing Generator Core Monitor to a Generator Gas Monitoring System similar to the General Electric GGMS including, but not limited to, the processor, piping, electronics, engineering, etc.

8.2 GENERATOR STATOR LEAK MONITORING SYSTEM

Contractor shall provide option pricing to provide all parts, materials and labor required to install a Generator Stator Leak Monitoring System including, but not limited to, the processor, piping, electronics, engineering, etc. Details of the proposed Stator Leak Monitoring System shall be incorporated herein.

9.0 GENERATOR UPRATE EVALUATION AND QUOTATION

9.1 GENERATOR UPRATE REQUIREMENTS

The Contractor shall provide an assessment of the generator to accommodate an uprate to:

1056 MVA, 0.9 power factor.

The evaluation will identify components requiring modification or replacement to support the uprate. A quotation will be provided for the necessary Parts and Services.

9.2 EQUIPMENT TO BE EVALUATED

The below equipment and systems will be included in the uprate evaluation:

- 9.2.1 Stator core
- 9.2.2 Stator core end
- 9.2.3 Armature winding
- 9.2.4 Rotor and Field Winding and associated components
- 9.2.5 Rotor Mechanical Capability
- 9.2.6 Main generator hydrogen coolers
- 9.2.7 High Voltage Bushings
- 9.2.8 Stator Water Cooling System
- 9.2.9 Hydrogen Control System
- 9.2.10 Collector Rings
- 9.2.11 Brush Rigging Assembly
- 9.2.12 Excitation System

The Contractor will address any other equipment impacted by the uprate. Unless specifically stated otherwise, the Purchaser will evaluate the iso-phase bus and neutral enclosure.

(Signature)

(Date)

Table 3.1 – Summary of critical clearing time calculations for three phase faults

Generator Exciter	Mona Fault	Gonder Fault	Mona Fault Far-End
GENERREX-CPS 6.0NR, Generator Field Test Data	8	8.5	
400% bus-fed, Generator Field Test Data	6.75	7.5	
GENERREX-CPS 6.0NR, Original GE Generator Design Data	9.75	10	13.5
250% bus-fed, Uprated GE Generator Design Data	7.25	8	12
280% bus-fed, Uprated GE Generator Design Data	7.5	8.25	12.5
300% bus-fed, Uprated GE Generator Design Data	7.75	8.5	12.75

1. Mona Fault: three-phase fault at the IPP bus followed by the loss of one of the IPP-Mona circuits
2. Gonder Fault: three-phase fault at the IPP bus followed by the loss of the IPP-Gonder line
3. Mona Fault Far-End: three-phase fault at the Mona bus followed by the loss of one of the IPP-Mona circuits

INTERMOUNTAIN POWER SERVICE CORPORATION

☐ REQUISITION FOR CAPITAL EQUIPMENT

☒ PURCHASE AUTHORIZATION FOR EXPENSE ITEMS

Purpose of Materials, Supplies or Services:

Perform a study to determine the maximum capability of the generator stator core, stator winding and the field.

Date:

Req./PA No: 172582

P.O. No:

Vendor:

Terms:

FOB:

Ship Via:

Conf. To:

Suggested Vendor: General Electric

Account No. 6525-503

Work Order No. _____

Project No. _____

Qty	Unit	Noun	Description Adjective	Catalog #	Seller or Manufacturer	Unit Cost	Extension
1	Lot		Perform an engineering study to determine the maximum capability of the existing General Electric Generators 280T150 and 151 stator core, stator winding and field .			\$10,000.00	\$10,000.00
		TOTAL ESTIMATED COST					\$10,000.00

Remarks: _____

Delivery requested by [Date] 10-01-01 Originator Jon P. Christensen

Dept. Mgr/Supt.
Date

Date

Station Manager

Date

Operating Agent

IP12_005203

PURCHASING PO STATUS INQUIRY - PO DETAIL PU4044
PO Number 02-21628 Purchase Priority 4 ROUTINE

Buyer 28093 LARSEN, J
Line 1
WO Number 01-19846-0 Equip No 2TGA--1
Crew No 81 Date Required 12/14/01
Stock Number DIRECT Account No 00-2TGX-502
1: Item Description PERFORM A CURSORY UPRATE ENGINEERING STUDY AND
EVALUATION OF THE GENERAL ELECTRIC GENERATORS,
Requisition Cost S/N 280T150 & 280T151.
NO CHARGE

THE INTENT OF THE STUDY IS TO DETERMINE THE
Commodity Code 999999 Actual Cost 10000.00000
Unit Measure PUR SV ISS SV Trade Disc (% \$)
Conversion 1 TO 1 Amount
Quantity Required 1 1 Result
Taxable (Y/N) Y Matl at Vendor
Scheduled Delivery 02/28/02 Std Freight Rate
Deliver To

2: General Notes

WHICH ONE (C=CONVERSION, V=VOUCHER, N=NOTES, P=PAY, <RTN>=CONTINUE) ?
D17901 18:36 10 JAN 2011 Intermountain Power Service Corp. USER.LIVE.DATA

IP12_005204

**GE Energy Services****Acknowledgement of Order for Services**TO: John LarsenADDRESS Intermountain Power Service Corp850 West Brush Wellman RoadDelta, UT 84624-9546

We thank you for your order. General Electric International, Inc. [GEII] agrees to furnish services as described in our quotation referenced below, and subject to the terms and conditions contained therein.

Payment terms Per terms of quotation

Customer Order Number	Order Date	Quotation Number	Quotation Date
02-21628	29 Oct 2001	J. Smedra Letter dated 25 Sept 2001	09/25/01

By Jeremiah Smedra Date October 31, 2001
 Signature *Jeremiah Smedra* Title Proposal Manager

Address 2180 South 1300 East, Suite 340Salt Lake City, UT 84106

Sale of any service (including any goods) covered by the order identified above is conditioned upon the terms contained in the original quotation referenced above, if any, and otherwise upon the terms contained herein. Any additional or different terms proposed by Buyer are objected to and will not be binding upon Seller, unless specifically assented to in writing by Seller's authorized representative. **NO IMPLIED OR STATUTORY WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE SHALL APPLY TO THIS ORDER AND ANY CLAIM THAT THE SERVICES DESCRIBED HEREIN ARE A WARRANTY OR OTHER OBLIGATION OF SELLER MUST BE MADE IN WRITING PRIOR TO, OR AT, THE TIME YOU PLACE YOUR ORDER.** Seller certifies that all goods described herein were produced in compliance with all applicable provisions of the Fair Labor Standards Act, as amended.

For those instances where a master agreement is in place between the Customer and GEII, the terms and conditions of the master agreement (subject to modifications made in GEII's quotation) shall have precedence over any alternative terms and conditions in any other document connected with this transaction unless such alternative terms and conditions are expressly incorporated by reference on the face of this Acknowledgement of Order for Services.

This Contract may be assigned or novated, in part or in whole, by General Electric International, Inc. ("GEII") to a wholly owned subsidiary of GEII upon written notice to customer setting forth the effective date of such assignment or novation. Upon the effective date of said assignment or novation, all of the rights and obligations of GEII under this Contract shall vest solely in the GEII subsidiary. Customer agrees to execute such documents as may be necessary to effect the assignment or novation.

PURCHASE ORDER DISTRIBUTION	
FSR NO.	NA
PROPOSAL NO.	G05912Q
DISTRIBUTION	
<input type="checkbox"/>	ORIGINAL TO FINANCE
<input checked="" type="checkbox"/>	COPY TO PROPOSAL FILE
<input type="checkbox"/>	COPY TO CUSTOMER PO FILE
<input type="checkbox"/>	COPY TO MES:
<input type="checkbox"/>	COPY TO ASC:
<input checked="" type="checkbox"/>	OTHER: Rayan Kassis -Comm Manager


IP12_005205

MEMORANDUM

INTERMOUNTAIN POWER SERVICE CORPORATION

TO: S. Gale Chapman

Page 1 of 3

FROM: Dennis K. Killian 

DATE: October 5, 2001

SUBJECT: Generator Reliability and Uprate Study

We recommend having Alstom perform a comprehensive study, including design of modifications, to optimize each of the generator systems, for \$80,000. We also recommend having GE perform a limited scope study of one generator operating point for \$10,000. General Electric bid \$250,000 for a study similar to Alstom's proposal. Please signify your acceptance of this proposal by signing the attached requisitions.

Although the existing generators are capable of continuous operation at 950 MW without any modifications, except for limiting the reactive power, the studies are necessary to provide information for rewinding the generator at a future date and replacing the excitation systems. The studies will also provide independent verification of the generators ability to operate at 950 MW and recommendations to limit heating which could affect the life of the generator. Our review of the manufacturer's design information and the Black & Veatch specifications indicate the generator can operate at 950 MW by limiting the power factor to 0.96 with a hydrogen pressure of 63 psi.

The scope of the recommended study by Alstom is as follows:

1. A review of the existing generator design to determine expected conditions when the generator is being operated, within the existing reactive capability curve (Drawing 474HA503), at outputs of 920 MW, 950 MW, and 975 MW. The study shall indicate the limiting power factor and reactive power at each operating point. The study shall also identify which components limit operation of the generator at these operating points or any operating parameters which might exceed generator alarm points. The study shall include a thermal analysis of generator components, including the

IP12_005206

generator bushings. This study shall include a review of the existing generator design, using current design programs, to determine the maximum nameplate rating for these generators.

2. Provide recommendations for increasing the nameplate rating for these generators while still using the existing field and stator winding. These recommendations shall include modifications to the stator cooling water system and hydrogen cooling system. Provide an estimated increase in rating with estimated costs for each modification.
3. Provide recommendations for increasing the nameplate rating for these generators by replacing the stator winding while still using the existing field. Provide an estimated increase in rating with estimated costs for rewinding the generators both with and without cooling system modifications from Item 2. Recommendations for rewind shall include interface with existing Generrex excitation system and for a replacement excitation system in Item 4.
4. Review existing Generrex excitation system and provide recommendations for replacement or upgrade. Analysis shall include a summary table which includes a description of the modification, a cost estimate for a complete engineering and design package for each modification, and a cost estimate for installation (including labor and materials) and schedule (supply and installation) requirements. Estimated schedule requirements shall be based on actual experience in performing similar modifications on other generators.

Proposals to perform this analysis shall include a fixed cost and a complete schedule to perform this work. Weekly progress reports shall be provided by e-mail and/or telephone on the status of the study. Progress reports shall include a list of items which might impact the completion of the study in accordance with the specified schedule.

Having Alstom perform the complete study and General Electric the reduced scope study allows us to use the conclusions from the reduced scope study, using GE design data, for validation of the Alstom model in the complete study.

Page 3 of 3

If you have any questions or require additional information
please contact Jon P. Christensen at ext. 6481.

JPC/JKH:jmg

Enclosures

IP12_005208



GE Energy Services

Jeremiah P. Smedra
Proposal Manager

GE International Inc. (GEII)
2180 South 1300 East, Suite 340
Salt Lake City, UT 84106
(801) 468-5712 / Fax (801) 468-5767
jeremiah.smedra@ps.ge.com

September 25, 2001

Mr. Jon Christensen
Intermountain Power Service Corporation
850 West Brush Wellman Road
Delta, UT 84624-9546

Subject: Generator Study and MAGIC Quote

Attachments: 1) MAGIC Quote
2) GEII Terms and Conditions

Jon:

Please find the enclosed quote for a MAGIC inspection per your request.

Additionally, GEII also provides the following quotes for Generator Engineering studies. The Cursory Uprate Study delivery time assumes a one-point evaluation (One MW rating and one MVAR rating). The evaluation of additional points will increase the delivery time. The delivery time for either study is subject to change based on existing workloads at the time of order.

Cost estimates and schedules for potential modifications are not included in the delivery time for the Complete Uprate Study. This information would be completed after the Complete Uprate Study report is issued and, depending on complexity, will require from one to three weeks to complete.

Cursory Uprate Study

This study provides a cursory evaluation of the generator uprate potential. The intent of the study is to examine the capability of major generator components to identify major limiting generator components that require modification to support the uprate potential. Major generator components include the stator core and winding and the rotor and field winding. The study also looks at Power Factor. The excitation system is not evaluated.

Price \$10,000

Delivery Four weeks ARO

IP12_005209

Perform an engineering study to determine the feasibility of increasing the rating of General Electric Generators 280T150 and 151. The study shall include:

1. A review of the existing generator design to determine expected operating conditions when the generator is being operated, within the existing reactive capability curve (Drawing 474HA503), at outputs of 920 MW, 950 MW and 975 MW. The study shall indicate the limiting power factor and reactive power at each operating point. The study shall also identify which components limit operation of the generator at these operating points or any operating parameters which might exceed generator alarm points. Study shall include a thermal analysis of generator components, including the generator bushings. This study shall include a review of the existing generator design, using current design programs, to determine the maximum nameplate rating for these generators.
2. Provide recommendations for increasing the nameplate rating for these generators, while still using the existing field and stator winding. These recommendations shall include modifications to the stator cooling water system and hydrogen cooling system. Provide an estimated increase in rating with estimated costs for each modification.
3. Provide recommendations for increasing the nameplate rating for these generators by replacing the stator winding, while still using the existing field. Provide an estimated increase in rating with estimated costs for rewinding the generators both with and without cooling system modifications from Item 2. Recommendations for rewind shall include interface with existing Generrex excitation system and for a replacement excitation system in Item 5.
4. Review existing Generrex excitation system and provide recommendations for replacement or upgrade as necessary.

Analysis shall include a summary table which includes a description of the modification, a cost estimate for a complete engineering and design package for each modification and a cost estimate for installation (including labor and materials) and schedule (supply and installation) requirements. Estimated schedule requirements shall be based on actual experience in performing similar modifications on other generators.

Proposals to perform this analysis shall include a fixed cost and a complete schedule to perform this work. Weekly progress reports shall be provided by e-mail and/or telephone on the status of the study. Progress reports shall include a list of items which might impact the completion of the study in accordance with the specified schedule.

Perform a cursory uprate engineering study and evaluation of the General Electric generators, serial numbers 280T150 and 280T151. The intent of the study is to determine the maximum capability of the major generator components, including the stator core and winding and the rotor and field winding. The study shall also evaluate Power Factor. The excitation system is not to be evaluated.

INTERMOUNTAIN POWER SERVICE CORPORATION

☐ REQUISITION FOR CAPITAL EQUIPMENT

☒ PURCHASE AUTHORIZATION FOR EXPENSE ITEMS

Purpose of Materials, Supplies or Services:

Generator Capability Study

Date: Sept 24, 2001

Req./PA No: 172582

P.O. No: 02-21628

Vendor: 1625 GE

Terms: 5

FOB: 5

Ship Via: 1

Conf. To: Jeremiah Smedha

Buyer

Delv. 12/14/01

Suggested Vendor: General Electric

Account No. 002TGX-402

Work Order No. 01-19846-00

Project No. IGS01-02

Qty	Unit	Description Noun Adjective Catalog # Seller or Manufacturer	Unit Cost	Extension
1	Lot	Perform ^a engineering study to determine the maximum capability of the stator core, stator winding and field for General Electric Generators 280T150 and 280T151.	\$10,000.00	\$10,000.00
<p><i>Refer to attached scope and G.E. Proposal</i></p> <p>RECEIVED dated Sept 25, 2001, page 1.</p> <p>OCT 11 2001 Note # 14, note # 14, Note # 15T & C 100</p> <p>PURCHASING Note: # 20</p> <p><i>All Reports are to be addressed to: Jon Christensen, P.E. (address)</i></p>				
TOTAL ESTIMATED COST				\$10,000.00

Remarks: Study required to determine operating parameters of the generator after the
Turbine upgrade.

Delivery requested by [Date] 10-01-01 Originator Jon P. Christensen

10-09-01 10-10-01
Dept. Mgr/Supt. Date Station Manager Date Operating Agent Date

sole source

ok NB 10/27/01

IP12_005212